

IN THE CLAIMS

Pursuant to 37 CFR §121(c), the following listing of the claims, including the text of the claims, will serve to replace all prior versions of the claims, in the application.

Please amend claims 11 through 60, as follows:

1 1. An apparatus for controlling the power management of a display monitor, said apparatus
2 comprising:

3 a power supply unit for converting an AC input voltage to a DC output voltage;

4 a voltage regulator for producing a constant output voltage supplied to the monitor;

5 a transformer for producing necessary operating voltages for each part of the monitor, in
6 which the output voltage of the voltage regulator being supplied to a primary of the transformer;

7 a feedback circuit for detecting current variation at the output of the transformer and for
8 supplying the detected variation value to the voltage regulator;

9 a switching circuit provided in a heater power supply line between one output of the
10 transformer and a heater of a color display tube of the monitor for switching off the heater power
11 supply line when the monitor enters a power-off mode;

12 a microcomputer operated in response to a video signal received at a video input port of
13 the monitor to produce a power control signal and a corresponding control mode indicating signal;

14 a signal input port connected to a video output of a computer; and

15 a signal amplifier for amplifying and processing a video input signal supplied to a signal
16 input of the color display tube.

1 2. The apparatus according to claim 1, the switching circuit including:

2 a first transistor for switching on or off the heater power supply line between one output
3 of the transformer and the heater of the color display tube in response to a base bias current
4 supplied from said output of the transformer;

5 a second transistor for selectively switching a base bias current path of the first transistor
6 to ground; and

7 a third transistor for selectively switching a operating voltage supply line to a base bias
8 resistor of the second transistor or to ground in response to the level of the power control signal
9 supplied from the microcomputer.

1 3. The apparatus according to claim 1, the microcomputer generating a continuous high
2 level signal as the power control signal when the monitor enters the power-off mode.

1 4. The apparatus according to claim 1, the microcomputer generating the mode indicating
2 signal consisting of a continuous pulse train signal having a predetermined on/off pulse duration,
3 when the monitor enters the power-off mode.

1 5. The apparatus according to claim 1, further comprising a mode indicator for indicating
2 the power control mode of the monitor in response to the power control signal and the mode
3 indicating signal, the mode indicator comprising:

4 a first voltage supply for operating a first light emitting diode (LED);

5 a second voltage supply for operating a second LED;

6 a first switching transistor operated in response to the mode indicating signal generated by
7 the microcomputer for switching on or off a first voltage supply line including the first LED to
8 ground; and

9 a second switching transistor operated in response to the power control signal generated
10 by the microcomputer for switching a second voltage supply line to ground; said second voltage
11 supply being connected to said first voltage supply through a series combination of a diode and the
12 second LED.

1 6. The apparatus according to claim 5, the first voltage being lower than the second
2 voltage.

1 7. (Amended) An apparatus for controlling the power management of a display monitor
2 having a color display tube, said apparatus comprising:

3 a power supply means for supplying power to the monitor including supplying a heater
4 voltage to a heater of the color display tube;

5 a switching circuit disposed between said power supply means and said heater of the color
6 display tube for selectively switching off the voltage to said heater when the monitor enters a
7 power-off mode; [and]

8 a control means connected to said switching circuit and receiving a video signal at a video
9 input port of the monitor and for producing a power control signal in response thereto for
10 controlling said switching circuit, said control means producing a mode indicating signal in

11 response to the video signal; and

12 a mode indicator connected to said control means, receiving the power control and mode
13 indicating signals from said control means, indicating a power mode of the monitor in response
14 to the power control and mode indicating signals.

1 8. (Amended) The apparatus according to claim 7, [further comprising a mode indicator
2 for indicating the power control mode of the monitor; and said control means further producing
3 a control mode indicating signal in response to said video signal, said mode indicator being
4 connected to said control means and indicating the power control mode of the monitor in response
5 to said power control signal and mode indicating signal generated by said control means] the video
6 signal including color picture signals R, G, and B.

1 9. (Amended) A method of controlling the power utilized by a display monitor having
2 a color display tube, said method comprising:

3 providing necessary operating voltages to the monitor including supplying a heater voltage
4 for [supplying] a heater of the color display tube of the monitor, the heater voltage being provided
5 from a power supply to the heater through a switching unit;

6 receiving a video signal at a video input port of the monitor and generating a power control
7 signal in response [thereto] to the video signal, the video signal including color picture signals R,
8 G, and B; [and]

9 selectively switching off the heater voltage to the heater of the color display tube in

10 response to the power control signal, said switching being performed by the switching unit
11 disposed between the power supply and the heater;
12 generating a mode indicating signal in response to the video signal; and
13 indicating a power mode of the monitor in dependence upon the power control and mode
14 indicating signals.

1 10. (Amended) The method according to claim 9, [further comprising the step of
2 providing a mode indicator for indicating the power control mode of the monitor;
3 generating a control mode indicating signal in response to the video signal received at the
4 video input port of the monitor; and
5 the mode indicator indicating the power control mode of the monitor in response to the
6 generated power control signal and mode indicating signal] said generating of the power control
7 and mode indicating signals being performed by a microcomputer, said indicating of the power
8 mode being performed by an indicating unit receiving the power control and mode indicating
9 signals from the microcomputer.

1 11. An apparatus, comprising:
2 a power supply providing electrical energy to a heater of a tube in a monitor; and
3 a switch disposed between said power supply and the heater, said switch interrupting
4 application of the electrical energy to the heater independently of other applications of the
5 electrical energy to the monitor when the monitor enters a power-off mode.

1 12. The apparatus of claim 11, further comprising:

2 a control unit receiving a video synchronization signal, and generating a control signal in
3 dependence upon the received video synchronization signal to control said switch.

1 13. The apparatus of claim 11, further comprising:

2 an indicator indicating a present power mode of the monitor.

1 14. The apparatus of claim 13, said present power mode of the monitor being one selected

2 from among a plurality of power modes, in accordance with display power management signaling
3 standard.

1 15. The apparatus of claim 14, said indicator comprising at least one light emitting diode.

1 16. The apparatus of claim 11, said switch comprising at least one transistor.

1 17. A method, comprising:

2 providing electrical energy to a heater of a tube in a monitor and to a plurality of electrodes
3 in the monitor;

4 providing a switch between a source of said electrical energy and the heater; and

5 operating the switch to interrupt application of the electrical energy to the heater

6 independently of other applications of the electrical energy to others of the plurality of electrodes
7 when the monitor enters a power-off mode when the monitor enters a power-off mode.

1 18. The method of claim 17, further comprising:
2 receiving a video synchronization signal; and
3 generating a control signal in dependence upon the received video synchronization signal
4 to control said switch.

1 19. The method of claim 17, further comprising:
2 indicating a power mode of the monitor.

1 20. The method of claim 19, said indicating of the power mode of the monitor being
2 performed in dependence upon a mode signal, the mode signal being generated in dependence
3 upon the video synchronization signal.

1 21. An apparatus, comprising:
2 a switch coupled between a source of electrical energy and one of a plurality of electrodes
3 in a display device, with others of the plurality of electrodes being disposed to respond to image
4 signals applied to the others of the plurality of electrodes to display varying images corresponding
5 to the image signals; and
6 a computer storage medium having stored thereon a set of instructions implementing a

7 method, the set of instructions comprising one or more instructions for:

8 providing the electrical energy to that one of the plurality of electrodes via
9 the switch to enable the display device to display the varying images; and
10 operating the switch to interrupt application of the electrical energy to that
11 one of the plurality of electrodes independently of other applications of the
12 electrical energy to the others of the plurality of electrodes when the monitor enters
13 a selected one of a plurality of power modes.

1 22. The computer storage medium according to claim 21, said set of instructions further
2 comprising one or more instructions for:

3 receiving a video synchronization signal; and
4 generating a control signal in dependence upon the received video synchronization signal
5 to control said switch.

1 23. The computer storage medium according to claim 21, said set of instructions further
2 comprising one or more instructions for indicating a current one of the power modes of the display
3 device.

1 24. The computer storage medium according to claim 21, said one or more instructions for
2 indicating a current one of the power modes of the display device comprising one or more
3 instructions for:

4 indicating a current one of the power modes of the display device based on a mode signal
5 generated in dependence upon the presence of a selected component of the image signals applied
6 to the display device.

1 25. A display device, comprising:
2 a control unit receiving signals, and generating a control signal in dependence upon the
3 signals received; and
4 a switch being disposed between a power supply and at least one but less than all of a
5 plurality of electrodes of the display device, said switch selectively switching in response to the
6 control signal between an ON mode that enables the display device to display images
7 corresponding to the signals received and a power-OFF mode, said switch switching to the ON
8 mode to apply electrical energy from the power supply to the at least one of the electrodes when
9 the control signal does not correspond to a power-OFF mode of the display device, and said switch
10 switching to the power-OFF mode to interrupt application of the electrical energy to the at least
11 one of the electrodes independently of other applications of the electrical energy from the power
12 supply to others of the plurality of electrodes when the display device enters the power-off mode.

1 26. The apparatus of claim 25, said received signals not including synchronization signals
2 when the monitor enters the power-OFF mode.

1 27. The apparatus of claim 25, further comprising:

2 an indicator indicating a present power mode of the monitor.

1 28. The apparatus of claim 27, said present power mode of the monitor being one selected
2 from among a plurality of power modes, in accordance with display power management signaling
3 standard.

1 29. The apparatus of claim 27, said indicator comprising at least one light emitting diode.

1 30. The apparatus of claim 25, said switch comprising at least one transistor.

1 31. A method, comprised of:
2 receiving at least one signal, and generating a control signal in dependence upon the signal
3 received;

4 when the control signal does not correspond to a power-OFF mode of a display device able,
5 when not in the power-OFF mode, to display images in correspondence to the signal received,
6 applying electrical energy from a power supply to a plurality of electrodes in the display device
7 that enable the display device to display the images in correspondence to signal received; and

8 when the control signal does correspond to the power-OFF mode of the display device,
9 interrupting application of the electrical energy to at least one of the electrodes independently of
10 other applications of the electrical energy from the power supply to others of the plurality of
11 electrodes.

1 32. The method of claim 31, the signal received not including synchronization signals when
2 the display device enters the power-OFF mode.

1 33. The method of claim 32, further comprised of indicating a power mode of the monitor.

1 34. The method of claim 33, said step of indicating of the power mode of the monitor
2 comprised of:

3 indicating the power mode of the monitor based on a mode signal, the mode signal being
4 generated in dependence upon the synchronization signals.

1 35. A computer storage medium having stored thereon a set of instructions implementing
2 a method, the set of instructions comprised of:

3 reading the instructions for the storage medium and responding to reception of at least one
4 signal by generating a control signal in dependence upon the signal received;

5 when the control signal does not correspond to a designated mode from among a plurality
6 of power modes of a display device able, when not in the designated mode, to display images in
7 correspondence to the signal received, applying electrical energy from a power supply to a plurality
8 of electrodes in the display device that enable the display device to display the images in
9 correspondence to signal received; and

10 when the control signal does correspond to the designated mode of the display device,
11 interrupting application of the electrical energy to at least one of the electrodes independently of

other applications of the electrical energy from the power supply to others of the plurality of electrodes.

36. The computer storage medium according to claim 35, said set of instructions further comprising one or more instructions for indicating a current one of the plurality of said power modes.

37. The computer storage medium according to claim 35, said set of instructions further comprising one or more instructions for indicating a current one of the plurality of said power modes of the display device based on a mode signal generated in dependence upon reception of components of a video signal by the display device.

38. An apparatus, comprising:
a control unit having an input terminal receiving an input signal applicable to drive a display device to generate images corresponding to the input signal, and having an output terminal providing a control signal in dependence upon the presence of a selected component of the input signal received, the control signal corresponding to a first power signal when the input signal does not include selected component;

a power supply supplying electrical energy to a display device;

a first one of a plurality of electrodes in the display device; and

a switch operationally disposed between said power supply and the first of the electrodes.

10 said switch having a first input terminal connected to receive the electrical energy from the power
11 supply, an output terminal connected to said first of the electrodes, and a second input terminal
12 connected to said control unit and receiving said control signal, said switch selectively operating
13 in response to the control signal received from said control unit by conveying the electrical energy
14 from said power supply to said first electrode when the control signal does not correspond to the
15 first power signal, said switch interrupting application of the electrical energy to at least the first
16 of the electrodes independently of other applications of the electrical energy from the power supply
17 to others of the plurality of electrodes when the control signal corresponds to the first power signal.

1 39. The apparatus of claim 38, further comprising an indicator indicating a current power
2 mode of the display device.

1 40. The apparatus of claim 39, said selected power mode of the display device being one
2 selected from among a plurality of power modes according to display power management signaling
3 standard.

1 41. The apparatus of claim 40, said indicator comprising at least one light emitting diode.

1 42. The apparatus of claim 38, said switch comprising at least one transistor.

1 43. A method, comprising:

2 detecting whether a signal component of an input signal is present in a video signal applied
3 to a display device providing displays of images corresponding to the input signal;

4 enabling the display device to provide displays of the images by generating a control signal
5 in dependence upon detection presence of the signal component, the input signal corresponding
6 to a first power mode enabling electrical energy to be applied to a plurality of electrodes in the
7 display device when the signal component is present; and

8 activating a switch operationally disposed between the power supply and a first of the
9 electrodes, to interrupt application of the electrical energy to at least a first, but less than all, of the
10 electrodes independently of other applications of the electrical energy from the power supply to
11 others of the plurality of electrodes when the control signal corresponds to an absence of the signal
12 component.

1 44. The method of claim 43, further comprised of indicating a selected power mode, said
2 selected power mode being selected from a plurality of power modes according to display power
3 management system standard.

1 45. The method of claim 44, said step of indicating of the power mode comprised of
2 indicating the power mode based on a mode signal generated in dependence upon the control
3 signal.

1 46. A computer storage medium having stored thereon a set of instructions implementing

2 a method, the set of instructions comprising one or more instructions:

3 during generation of visible images corresponding to input signals applied to a display
4 device, detecting whether a specified component of the input signal is present;

5 generating a control signal in dependence upon the detection of the specified component
6 of the input signal, with the control signal corresponding to a first power signal when the specified
7 component of the input signal is not present;

8 conveying electrical energy from a power supply to a first one of a plurality of electrodes
9 in the display device when the first power signal is not generated; and

10 preventing the electrical energy from the power supply from being conveyed to the first one
11 of the electrodes when the first power signal is generated by interrupting application of the
12 electrical energy to the first one of the electrodes independently of other applications of the
13 electrical energy to the display device when the display device enters a power-off mode.

1 47. The computer storage medium claim 46, said set of instructions further comprising one
2 or more instructions for:

3 indicating a selected power mode, said selected power mode being selected from a plurality
4 of power modes according to display power management system standard.

1 48. The computer storage medium claim 47, said set of instructions further comprising one
2 or more instructions for:

3 indicating the power mode based on a mode signal, the mode signal being generated in

4 dependence upon the control signal.

1 49. An apparatus for controlling the power management of a display monitor having a color
2 display tube, the apparatus comprising:

3 a power supply unit supplying a heater voltage to a heater of the color display tube;

4 a switching circuit disposed between said power supply unit and said heater selectively
5 switching off the voltage to said heater when the monitor enters power-off mode;

6 a control unit connected to said switching circuit, receiving an input signal at a video input
7 port of the monitor, producing a power control signal in response to the input signal, said
8 switching circuit switching in response to the power control signal to interrupt application of the
9 electrical energy to the heater independently of other applications of the electrical energy to the
10 monitor when the monitor enters a power-off mode, said control unit producing a mode indicating
11 signal in response to the input signal; and

12 a mode indicator connected to said control unit, receiving the mode indicating signal from
13 said control unit, and indicating a power mode of the monitor in response to the mode indicating
14 signal.

1 50. The apparatus according to claim 49, said mode indicator comprising one or more light
2 emitting diodes.

1 51. A method of controlling the power utilized by a display monitor having a color display

2 tube, the method comprising:

3 providing necessary operating voltage to the monitor including supplying a heater voltage
4 for a heater of the color display tube of the monitor, the heater voltage being provided from a
5 power supply to the heater through a switching unit;

6 receiving an input signal at a video input port of the monitor and generating a power control
7 signal in response to the input signal;

8 selectively switching off the heater voltage to the heater of the color display tube in
9 response to the power control signal, by interrupting application of the electrical energy to the
10 heater independently of other applications of the electrical energy to the monitor when the monitor
11 enters a power-off mode;

12 generating a mode indicating signal in response to the input signal; and

13 indicating a power mode of the monitor in dependence upon the mode indicating signal.

1 52. The method according to claim 51, further comprising:

2 detecting whether said input signal includes a synchronization signal; and

3 generating said power control signal when said input signal does not include the
4 synchronization signal.

1 53. An apparatus, comprising:

2 a control unit receiving an input signal, generating a power control signal in dependence
3 upon said input signal, said control unit being configured to generate a mode indication signal in

4 dependence upon said input signal;

5 a switching unit receiving a power and receiving said power control signal, said switching
6 unit switching on and off in dependence upon said power control signal, said switching unit
7 switching on to supply the received power to a heater in a monitor, said switching unit interrupting
8 application of the electrical energy to the heater independently of other applications of the
9 electrical energy to the monitor when the monitor enters a power-off mode when said power
10 control signal corresponds to a power-off mode; and

11 a mode indicator receiving said mode indication signal from said control unit, said mode
12 indicator indicating a power mode of the monitor in dependence upon said received mode
13 indication signal.

1 54. The apparatus of claim 53, said control unit being configured to generate said power
2 control signal when said input signal does not include a synchronization signal.

1 55. A display device, comprising:
2 a power supply providing electrical energy to a plurality of electrodes influencing display
3 of images corresponding to input signals applied to the display device;
4 a control unit detecting components of the input signals, and generating a first control
5 signal when said input signals bear a selected one of the components;
6 a switch disposed between said power supply and a one, but less than all, of the electrodes,
7 said switch interrupting application of the electrical energy to the heater independently of other

8 applications of the electrical energy to the display device when the display device enters a selected
9 one of a plurality of power modes.

1 56. The display device of claim 55, said control unit being configured to generate a second
2 control signal when said components are detected, said switch switching to a power-ON mode in
3 response to the second control signal and conveying the power from said power supply through
4 said switch to said one of the electrodes.

1 57. The display device of claim 55, further comprising:
2 an indicator indicating a currently selected one of the power modes of the display device,
3 said currently selected power mode being selected from a plurality of power modes according to
4 display power management signaling standard.

1 58. The display device of claim 57, said indicator indicating the power mode of the display
2 apparatus in dependence upon a mode signal received from said control unit, said control unit
3 generating the mode signal in dependence upon a detection of said components.

1 59. The apparatus of claim 58, said indicator comprising at least one light emitting diode.

1 60. The apparatus of claim 55, said switch comprising at least one transistor.